

on the power of the telescope, and thence computes the corresponding change in the refractive index of the fluid. The result is the amount of adjustment already stated. The correction for angular measurements was the 60th part of a second in every minute, for every degree of thermometric change; a quantity, Mr. Barlow observes, which is too small to deserve notice, except in cases of extreme delicacy. The dispersions at 31° and at 84° are in the ratio of 3067 to 3084. The change in the refractive index between 32° and 212° , supposing it to increase uniformly, would be about one tenth of the whole,—a proportion which is very nearly the same as the actual expansion of the fluid. Hence it is considered as probable, that in this and all other expansible fluids, the index of refraction varies directly as the density. On the other hand it would appear, that the dispersive ratio remains, at all temperatures, constantly the same.

On some Circumstances relating to the Economy of Bees. By Thomas Andrew Knight, Esq. F.R.S. President of the Horticultural Society. Read May 22, 1828. [*Phil. Trans.* 1828, p. 319.]

The author had already stated, in a former communication to the Royal Society, his having noticed that for several days previous to the settling of a swarm of bees in the cavity of a hollow tree adapted to their reception, a considerable number of these insects were incessantly employed in examining the state of the tree, and particularly of every dead knot above the cavity which appeared likely to admit water. He has since had an opportunity of observing that the bees who performed this task of inspection, instead of being the same individuals as he had formerly supposed, were in fact a continual succession of different bees; the whole number in the course of three days being such as to warrant the inference that not a single labouring bee ever emigrates in a swarm without having seen its proposed future habitation. He finds that the same applies not only to the place of permanent settlement, but also to that where the bees rest temporarily, soon after swarming, in order to collect their numbers.

The swarms, which were the subjects of Mr. Knight's experiments, showed a remarkable disposition to unite under the same queen. On one occasion a swarm, which had arisen from one of his hives, settled upon a bush at a distance of about twenty-five yards; but instead of collecting together into a compact mass, as they usually do, they remained thinly dispersed for nearly half an hour; after which, as if tired of waiting, they singly, one after the other, and not in obedience to any signal, arose and returned home. The next morning a swarm issued from a neighbouring hive, and proceeded to the same bush upon which the other bees had settled on the preceding day; collecting themselves into a mass, as they usually do when their queen is present. In a few minutes afterwards a very large assemblage of bees rushed from the hive from which the former

swarm had issued, and proceeded directly to the one which had just settled, and instantly united with them. The author is led from these and other facts to conclude that such unions of swarms are generally, if not always, the result of previous concert and arrangement.

The author proceeds to mention some circumstances which induce him to believe that sex is not given to the eggs of birds, or to the spawn of fishes or insects, at any very early period of their growth. Female ducks, kept apart from any male bird till the period of laying eggs approached, when a musk drake was put into company with them, produced a numerous offspring, six out of seven of which proved to be males.

The mule fishes found in many rivers where the common trout abounds, and where a solitary salmon is present, are uniformly of the male sex; hence the spawn must have been without sex at the time it was deposited by the female.

The author states that he has also met with analogous circumstances in the vegetable world, respecting the sexes of the blossoms of monoecious plants. When the heat is excessive, compared with the quantity of light which the plant receives, only male flowers appear; but if the light be in excess, female flowers alone are produced.

On the Laws of the Deviation of Magnetized Needles towards Iron.
By Samuel Hunter Christie, Esq. M.A. F.R.S. &c. Read June 5, 1828. [*Phil. Trans.* 1828, p. 325.]

The author had pointed out, several years ago, the law of deviation of a magnetized needle, (either freely suspended or constrained to move in any particular plane,) from its natural position, by the influence of masses of iron in its vicinity. This law was founded on the hypothesis that the iron *attracted* both the poles of the needle: the position of which, resulting from this action, might be determined by that of an imaginary minute magnetic needle, freely suspended by its centre of gravity, reduced to the plane of revolution. The author had considered this law as fully established from its accordance with experiment; but Mr. Barlow, in a paper which was published in the last volume of the Philosophical Transactions, denies that such an accordance exists, and infers, from the results of some experiments which he made on horizontal needles, having their magnetism unequally distributed in their two branches, that the theory on which the preceding law is founded is fallacious. In opposition to the views of Mr. Barlow, the author contends that the phenomena observed are precisely those which must result from the theory he had himself adopted; and that they tend in no way to support the hypothesis of their being simply the effects of the magnetic power which the iron receives by induction from the earth.

The author was also led to suspect the accuracy of another conclusion which had been drawn by Mr. Barlow, namely, that the